## REMARKS

This Amendment, submitted in response to the Office Action of April 2, 2002, is believed fully responsive to each point of objection and rejection raised therein. Favorable reconsideration is respectfully requested.

As a preliminary matter, the Examiner has objected to the drawings for a number of reasons set forth in paragraphs 2-6. In response thereto, Applicant submits herewith revised drawings with corrections shown in red ink and also a set of revised drawings with changes incorporated. The text at the bottom of Figure 5 has been deleted and moved to the end of paragraph 5 on page 4. The corrections, taken together with the changes to the specification as discussed below, are believed to address and overcome each objection raised by the Examiner, with the exception of the objection set forth in paragraph 6.

Applicant respectfully traverses the drawing objection set forth in paragraph 6. The drawings as corrected and revised illustrate at least every structural component recited in the claim. Applicant believes that Rule 83(a) does not impose any additional requirements. Moreover, it is not clear how to illustrate the "type of reflected light fluorescence." Should the Examiner maintain this objection, Applicant respectfully request clarification as to what the Examiner deems is required.

In view of the above, Applicant respectfully requests approval and entry of the drawing changes, and based thereon reconsideration and withdrawal of the drawing objections.

Also as a preliminary matter and at the Examiner's request, Applicant has reviewed the specification for all possible minor errors. Based on this review, several amendments have been made to the specification to address the objections raised by the Examiner in paragraph 8, to

ensure the use of consistent language throughout the specification, and to correct other grammatical and idiomatic errors. No new matter has been added.

In addition, responding to specific objections:

(a) The term "nosepiece" has been replaced by "objective turret with automatic shift," which is believed more descriptive with this component and which renders the description consistent with that which is shown in the drawings (see, for example, Figure 5). Reference numeral 9 refers to this component.

(b) Applicant does not believe that the type of "Petri dish" is material to the present invention and that someone of skill in the working art would clearly understand what this phrase means and refers to. In any event, a typical "Petri dish" used is made of clear plastic and has a diameter of either 36 or 90 mm.

(c) The illuminator denoted by "GFP" means Green Fluorescent Protein.

(d) The power supply is now denoted by reference numeral 13 and not 24. Appropriate corrections have been made.

(e) The switch box is now denoted by reference numeral 16 and not 22. Appropriate corrections have been made.

(f) The fiberoptic cable 14 and fiberoptic bundle 21 refer to the same component. Corrections have been made to refer to this component as the fiberoptic bundle denoted by reference numeral 14.

(g) The special combining prism 25 is an optical component known in the art. Specifically, a combining prism splits a single beam path image into two beam path binocular

images for viewing by an observer. The specification has been amended for clarification to the extent that the function of this component is not otherwise clear.

(h) See (a) above.

(i)

Applicant respectfully request reconsideration and withdrawal of the objections to the disclosure.

Claim 1 is pending in the application and it stands rejected. Specifically, the Examiner rejects claim 1 under 35 U.S.C. § 112 (second paragraph) and rejects claim 1 under 35 U.S.C. § 103(a) as being unpatentable over Koyama et al in view of Spitznas et al.

With regard to the rejection of the claim under 35 U.S.C. § 112 (second paragraph), Applicant respectfully submits that the foregoing clarifying amendments to claim 1 obviate each instance of indefiniteness cited by the Examiner.

In addition to the claim amendments, Applicant provides the following explanation of the automated shift mechanism and of the special splitting prism function for the Examiner's benefit. Reference is made to Figure 4 of the present application and to the attached drawing labeled Sketch 1.

When the objective turret with automatic shift (9) is rotated from the stereo objective (29) position to either of the compound objective (31) positions, the excenter bearing (30E) activates the pivot arm (30P) which moves the microscope carrier (B) over to a single optical path of the stereo microscope. Now the compound objective (31) is centered to the single optical path and directly over the center of the sample to be viewed. The spring (30S) maintains constant pressure on the excenter bearing (30E) to insure smooth movement of the microscope carrier (B)

without backlash. The above position of the objective turret with automatic shift (9) places the compound objective (31) in position to create a 2 dimensional monocular image. In this position the automated placement of the special combining prism (25) places the prism into the optical path. This special combining prism (25) splits the monocular image in a 50/50 fashion to create binocular 2 dimensional image for observation.

When the objective turret with automatic shift (9) is rotated from the compound objective (31) position to the stereo objective (29) position, the excenter bearing (30E) activates the pivot arm (30P) which moves the microscope carrier (B) to the stereo observation position where both optical axes of the stereo microscope are positioned properly over the stereo objective (29) to create a three dimensional image. In this position the special combining prism (25) is automatically removed from the optical path permitting three dimensional viewing.

Both the stereo objective (29) and the compound objective (31) stop directly over the center position of the viewing area of the sample so that parcentricity is maintained.

Accordingly, in view of the amendments to claim 1 and the foregoing explanation, reconsideration and withdrawal of the §112 (second paragraph) rejection are respectfully requested.

The rejection of claim 1 on prior art grounds (Koyama et al in view of Spitznas et al.) is respectfully traversed.

More specifically, Koyama relates to an optical microscope having a revolver for selectively inserting a plurality of objective lenses including a low-magnification objective lens on an optical axis for observation light.

Koyama thus allows for a low magnification objective lens to be positioned on the microscope via a turret to create low magnification fluorescence images. This in combination with an auxiliary lens permits low power two dimensional images to be formed. These along with the high power lenses on the microscope allow for formation of high power two dimensional images. The optical microscope disclosed by Koyama is entirely a two dimensional system for fluorescence imaging.

In contrast, the present invention permits on one microscope the creation of either/or a two and three dimensional fluorescence images to be formed. This is achieved by use of the objective turret with automatic shift (9), which positions a stereo objective (29) or a compound objective (31) to create either type of image. This feature is neither taught nor suggested by Koyama.

Moreover, the stereoscopic 3 dimensional images permit the uses to sort, pick or manipulate samples in fluorescence. This can not be properly done in 2 dimensions. The high magnification (2 dimensional) feature of the present invention permits the user to check or verify the presence of small structural details in the sample and then allows user to return to the stereoscopic (3 dimensional) image to pick, sort or manipulate the samples, all from one microscope and without having to move the sample from one location to another. Clearly, Koyama does not teach or suggest this feature.

In addition, according to the microscope claimed in the present application, there is the benefit of stereoscopic (3 dimensional) fluorescence imaging, which permits the user to insert probes into small structures in samples and manipulate these structures. Using the high magnification feature permits the user to verify placement of probes into structures. Probes

cannot be placed properly in structures with a two dimensional imaging system. Thus, the present invention allows proper placement of probes using stereoscopic (3 dimensional) images and verification of placement with compound objective (two dimensional) images.

The secondary reference, Spitznas, does not make up the significant deficiencies of Koyama. Thus, considering Koyama and Spitnas in combination or alone, the prior art fails to render the present invention unpatentable. The combination of the two references does not teach or suggest a microscope that permits viewing of biological samples in three optical ways, including in three dimension (stereoscopic), two dimension (compound optic), and macro with reflected light fluorescence. Each of three optical views can be carried out on one system. The system permits the user to sort samples under stereo fluorescence illumination and to verify structural detail under compound optic fluorescence illumination on one instrument. The three position rotating objective carrier with automatic shift houses one stereoscopic and two compound objectives.

In all other references cited but not applied, nosepieces with a plurality of lenses are all referring to compound lenses only. The present invention is unique since it places both compound objectives (31) and stereo objectives (20) on the same objective turret with automatic shift (9) for both two dimensional and three dimensional observations on one instrument.

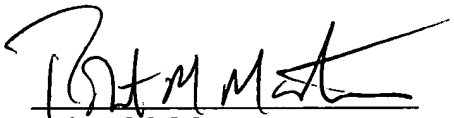
For all of the foregoing reasons, Applicant respectfully requests reconsideration and withdrawal of the prior art rejection of claim 1.

By this Amendment, Applicant adds new claims 2-6 for consideration. Claims 2-6 provide further coverage of the present invention. They are believed patentable over the art of record for at least the reasons set forth above.

In view of the above, reconsideration and allowance of this application are now believed to be in order, and such actions are hereby solicited. If any points remain in issue which the Examiner feels may be best resolved through a personal or telephone interview, the Examiner is kindly requested to contact the undersigned at the telephone number listed below.

The USPTO is directed and authorized to charge all required fees, except for the Issue Fee and the Publication Fee, to Deposit Account No. 19-4880. Please also credit any overpayments to said Deposit Account.

Respectfully submitted,



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Date: July 2, 2002

## APPENDIX

## VERSION WITH MARKINGS TO SHOW CHANGES MADE

**IN THE SPECIFICATION:**

**The specification is changed as follows:**

**Page 1, paragraph 2:**

The present invention is directed to a microscope that permits three optical techniques in one system. The microscope allows biological samples, as an example, to be viewed in three dimension (stereoscopic), two dimension (compound optic) and macro with reflected light fluorescence and transmitted light brightfield. The microscope permits the user to sort samples under stereo fluorescence illumination and to verify structural detail under compound optic fluorescence illumination on one instrument. The three position rotating [nosepiece] objective turret with automatic shift houses one stereoscopic and two compound [lens. All lens] objectives. All objectives are, by way of example, parcenter and parfocal.

**Page 1, paragraph 3:**

Conventionally, fluorescence equipped stereo microscopes permit users to view samples, typically in a magnification range of 10x-120x. If the magnification is sufficient to observe the structure in fluorescence, then sorting of the sample is possible. On the other hand, if the magnification is insufficient to view the structure in common, each sample must be taken out of the Petri dish, placed on a microscope slide, and transferred to another high [magnificaion]

magnification compound fluorescence microscope for evaluation and selection. The prior art thus was extremely tedious and time consuming.

**Page 2, paragraph 2:**

The system according to the invention thus has the following advantages. First, it provides two-dimension and three-dimension images on one microscope system for both transmitted light brightfield and reflected light fluorescence viewing. [A nose piece] An objective turret with automatic shift is provided for one stereo [lens] objective and two compound [lenses. When the nosepiece rotates to compound lens] objectives. When the objective turret with automatic shift rotates from stereo objective to compound objective, the microscope automatically shifts left to single optical axial system. [while lens remains in center of field of view. Lenses] Both the stereo objective and the compound objective positions allow the sample in view to remain in the middle of the area seen by the observer. Objectives are parcenter and parfocal.

**Page 2, paragraph 5, which bridges over to page 3:**

According to the present invention, there is provided a microscope having a microscope for viewing samples in [steroscopic] stereoscopic and in compound optical images in transmitted light brightfield and reflected light fluorescence, said microscope comprising: a stereo [lens] objective; a compound [lens] objective; [a nosepiece] an objective turret with automatic shift carrying said stereo [lens] objective and said compound [lens] objective; stereo microscope body that is shiftable about an axis to be placed properly over the stereo [lens] objective or the

compound [lens] objective; a transmitted light base for providing illumination for transmitted light brightfield for said stereo and compound [lenses] objectives; and a prism shift mechanism to create binocular images from a single axis compound image created.

**Page 3, paragraph 6:**

Figure 5 illustrates a bottom view of the [nosepiece (objective turret)] objective turret with automatic shift from the microscope of Figure 1;

**Page 4, first full paragraph:**

Figure 1 is a side view of the microscope. The microscope includes a transmitted light base 1, compound objective 31 [(objective turret) 2], focus drive 3, an auto prism shift mechanism [4] 28, viewing head 5, eyepieces 6, GFP (Green Fluorescent Protein) Quad turret illuminator 7, stereo microscope body 8, objective turret with automatic shift 9, and a stereo objective [10] 29.

**Page 4, paragraph 2:**

Figure 2 shows a top view of the transmitted light base 1. It includes a control knob for selecting [condensor] condenser or mirror (with aperture control) 11, aperture diaphragm 12, power supply 13, fiberoptic [cable] bundle 14, solenoid switch 15, switch box 16, high power [condensor] condenser 17, frosted mirror 18, adjustment knob for mirror tilt 19, and a plain mirror 20.

**Page 4, paragraph 3:**

Figure 3 shows a rear view of the transmitted light base 1, which further includes a fiberoptic bundle [21] 14, switch box [22] 16, solenoid 23, and a power supply [24] 13.

**Page 4, paragraph 4:**

Figure 4 is a top view of an auto prism shift assembly 4. The assembly includes a special combining prism 25 which splits single beam path image into two beam path binocular images for viewing by observer, linkage for prism adjustment 26, magnet for quick release 27, and flexible cable for auto shift mechanism [attaches to nosepiece] 28 which attaches to objective turret with automatic shift 9.

**Page 4, paragraph 5:**

Figure 5 is a bottom view of the [nosepiece (objective turret)] objective turret with automatic shift 9. It includes a stereo objective receptacle 29, auto axial shift mechanism 30, and two receptacles for two compound objectives 31. When rotating objective turret with automatic shift (9), the microscope carrier (B) automatically moves from the stereo objective to the compound objective position.

**Page 4, paragraph 6:**

Figure 6 depicts a top view of a quadruple filter turret assembly and filter module, including permanent magnets 32, 34, filter module [33] 36, and filter turret 35.

**Page 4, paragraph 7:**

Figures 7a, 7b, 7c and 7d illustrate various views of filter modules 36, including filter module 36, a safety key 37 and a barrier filter slider 38.

**Page 5, paragraph 2:**

The microscopic system combines the capabilities of a stereo fluorescence microscope and the optics of a compound microscope for fluorescence on one system. Both two-dimensional and three-dimensional images are on one system. It permits fluorescence observations in the stereoscopic mode (mag. 10x-120x). In addition the system has [a nosepiece (objective turret)] an objective turret with automatic shift 9 which can hold two infinity corrected high magnification, long working distance lenses 31 (mag. possible up to 700x) as well as the stereo lens 29 (Figure 5). When either of these lenses is rotated into the optical path, the stereo microscope optical system 8 (Figure 1) shifts to the left while the objective remains over the center of the optical field. This allows the optical center to remain constant and the compound objective now functions through the right side optical axis of the stereo microscope. This new resulting 2-D high magnification fluorescence image is then split with a prism 25 (Figure 4) to create binocular observation.

**Page 6, paragraph 3:**

For example, one filter module for Green Fluorescence [Protien] Protein (GFP) excitation:

Filter module has exciter filter: 470mm

Dichroic mirror: 485mm

Two sliders available for emission either 500 LP or 525BP

Sliders are interchangeable so that on one filter module, the user can see either wideband (500 LP) or narrow band (525 BP) GFP by exchanging barrier filter sliders.

**Page 7, paragraph 1:**

The [nosepiece (objective turret)] objective turret with automatic shift 9 is linked to an automated axial shift mechanism 30 (Figure 5). When the stereo [lens] objective is in place, it is centered under the dual path of the stereo optics carrier. This permits 3D observation in fluorescence. When the [nosepiece] objective turret with automatic shift is rotated to being either of the compound lenses 31 into position, the [optics] microscope carrier [8] B is automatically shifted so that the single right hand optical pathway of the stereo optics carrier is centered above the compound objective. This now permits a 2D observation in fluorescence. The sample remains parcenter to the field of view since the stereo [lens] objective and compound [lens] objective each stop in the exact same position. In addition the [lens] objectives are adjustable to be parfocal to each other.

**Page 7, paragraph 2:**

The [nosepiece] objective carrier with automatic shift 9 is also automatically linked to the prism shift[mechansim] mechanism 4. When the [nosepiece] objective carrier with automatic shift 9 is in stereo position, the prism 25 (Figure 4) is automatically out of path. When [nosepiece] the objective carrier with automatic shift 9 is rotated to compound position, the prism 25 is automatically shifted into position. This prism 25 then takes the single beam path of observable light from the right hand optical path, and splits it into a binocular image for binocular observation. It can be manually slid out of the path to allow 2x light intensity.

**Page 8, paragraph 1:**

There has thus been shown and described a microscope which fulfills all of the objects and advantages sought therefore. Many changes, modifications, variations, and other uses and applications of the subject invention will, however, become apparent to those skilled in the art after considering the specification [an] on the accompanying drawings which disclosed [perferred] preferred embodiments thereof. Also, changes, modifications, variations, and other uses and applications which do not depart from the spirit and scope of the invention are deemed to be covered by the in invention which is limited only by the claims which follow.

**IN THE CLAIMS:**

**The claims are amended as follows:**

1. A microscope for viewing samples in stereoscopic and in compound optical images in transmitted light brightfield and reflected light fluorescence, said microscope comprising:

a stereo[lens] objective;

a compound [lens] objective;

[a nosepiece] an objective carrier with automatic shift carrying said stereo [lens] objective and said compound [lens] objective;

stereo microscope body that is shiftable about an axis to be placed [properly] over the stereo [lens] objective or the compound [lens] objective;

a transmitted light base for providing illumination for transmitted light brightfield for said stereo and compound [lenses] objectives; and

[a] an automated prism shift mechanism, disposed in an optical path, to create binocular images from a single axis compound image created.

**Claims 2-6 are added as new claims.**

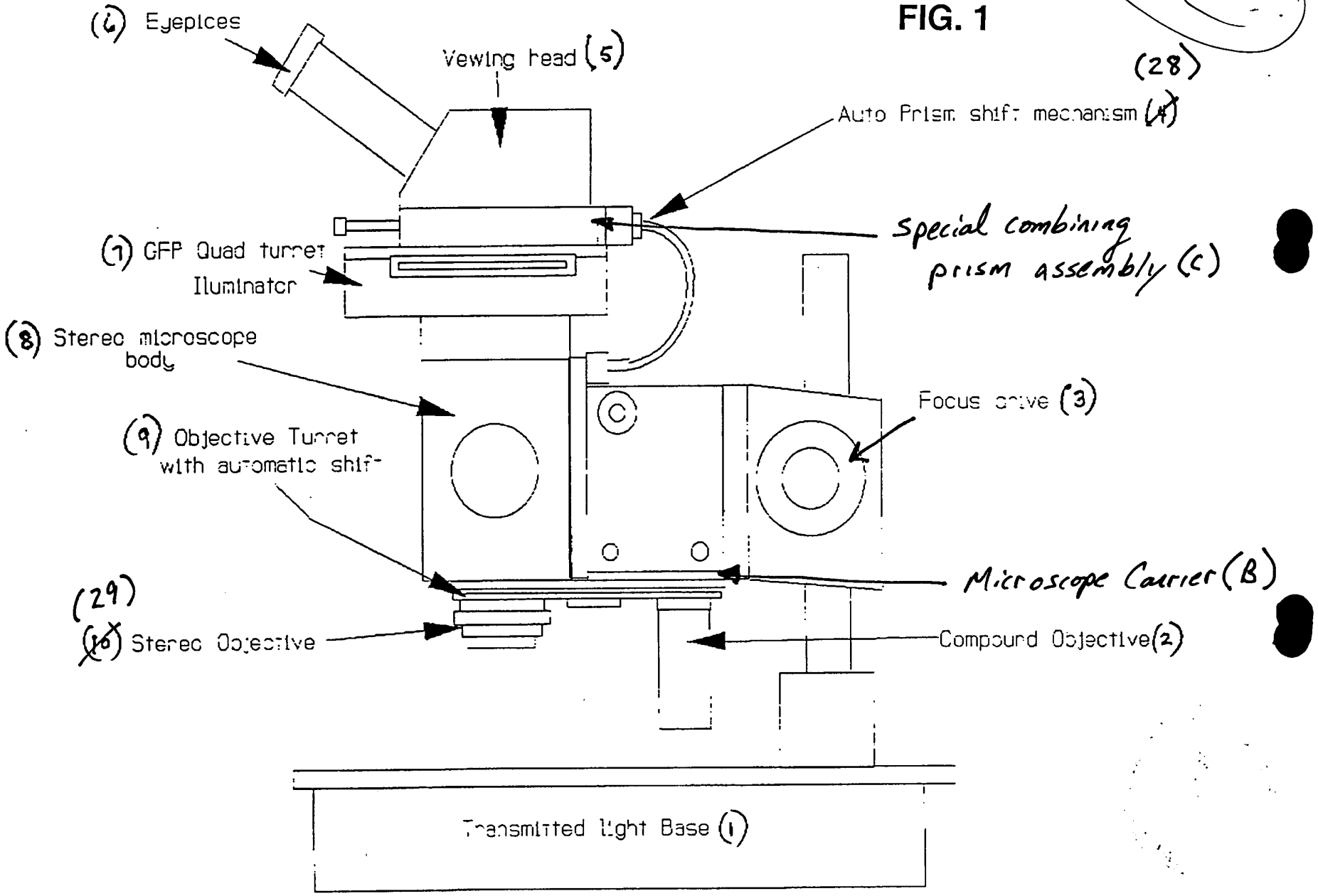
**IN THE ABSTRACT OF DISCLOSURE:**

**The abstract is changed as follows:**

A system that permits biological samples to be viewed in three optical ways, including in three dimension (stereoscopic), two dimension (compound optic), and macro with reflected light fluorescence. Each of three optical views can be carried out on one system. The system permits

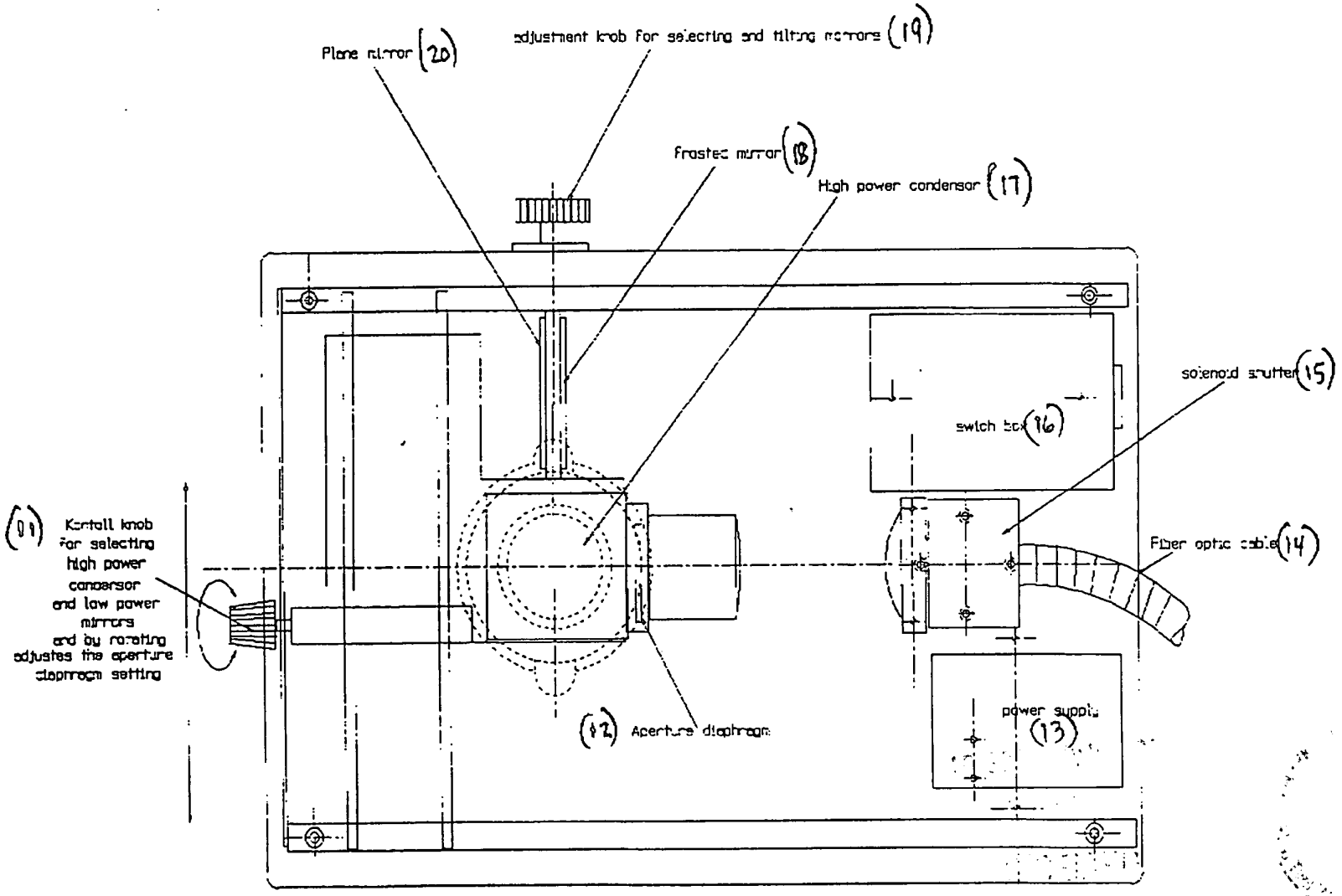
the user to sort samples under stereo fluorescence illumination and to verify structural detail under compound optic fluorescence illumination on one instrument. The three position rotating [nosepiece] objective carrier with automatic shift houses one stereoscopic and two compound [lenses] objectives. All [lenses] objectives are parcenter and parfocal.

FIG. 1


(6) Eyepices
Viewing head (5)
Auto Prism shift mechanism (4)
(28)
special combining prism assembly (C)
(7) GFP Quad turret Illuminator
(8) Stereo microscope body
Focus drive (3)
(9) Objective Turret with automatic shift
Microscope Carrier (B)
(29)
(10) Stereo Objective
Compound Objective (2)
Transmitted light Base (1)

TRNSMITTED LIGHT BASE

FIG. 2



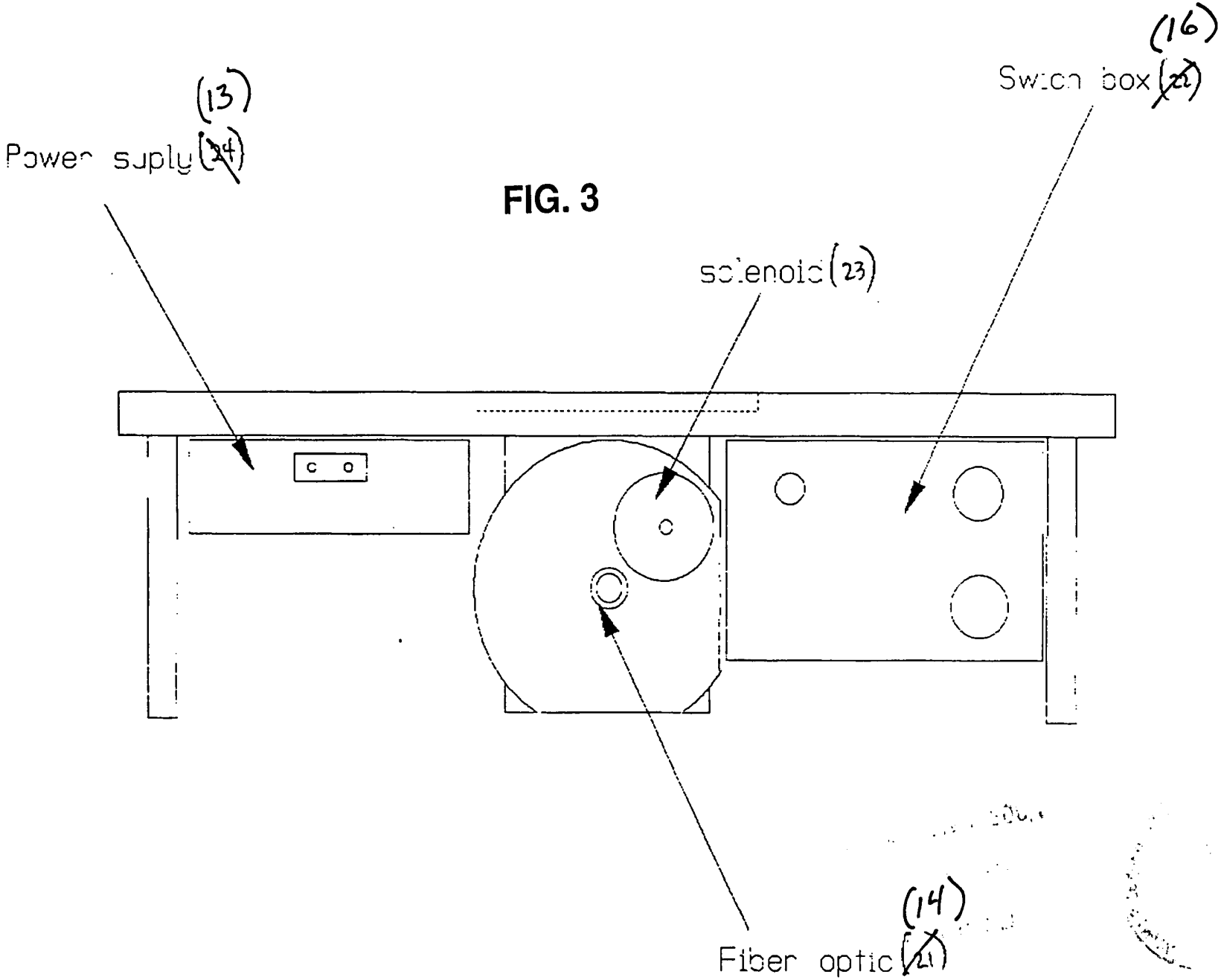

(16)
Switch box (22)
(13)
Power suply (24)
solenoid (23)
Fiber optic (21)
(14)

FIG. 3

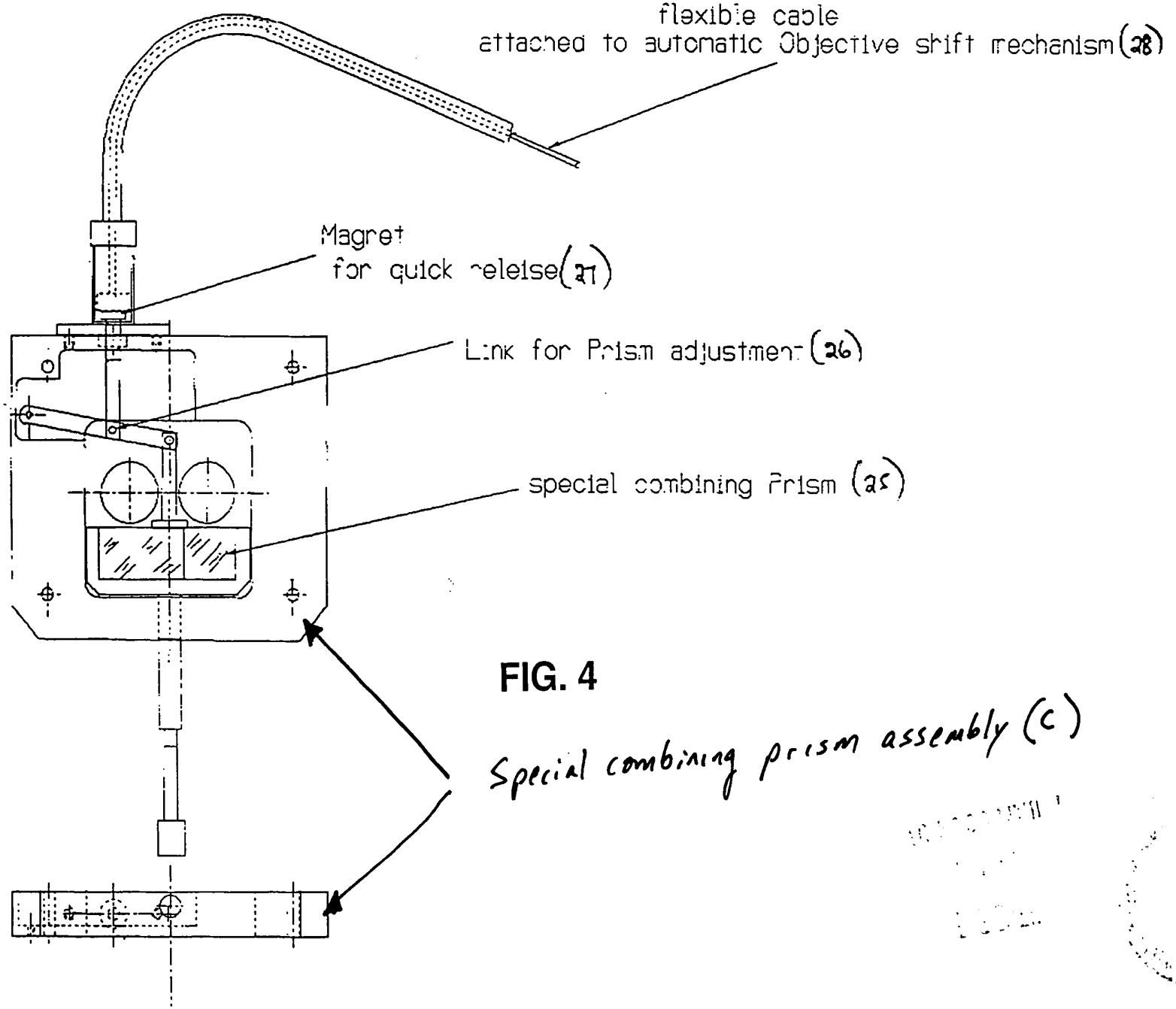

flexible cable
attached to automatic Objective shift mechanism (28)
Magret
for quick release (27)
Link for Prism adjustment (26)
special combining Prism (25)
Special combining prism assembly (C)

FIG. 4

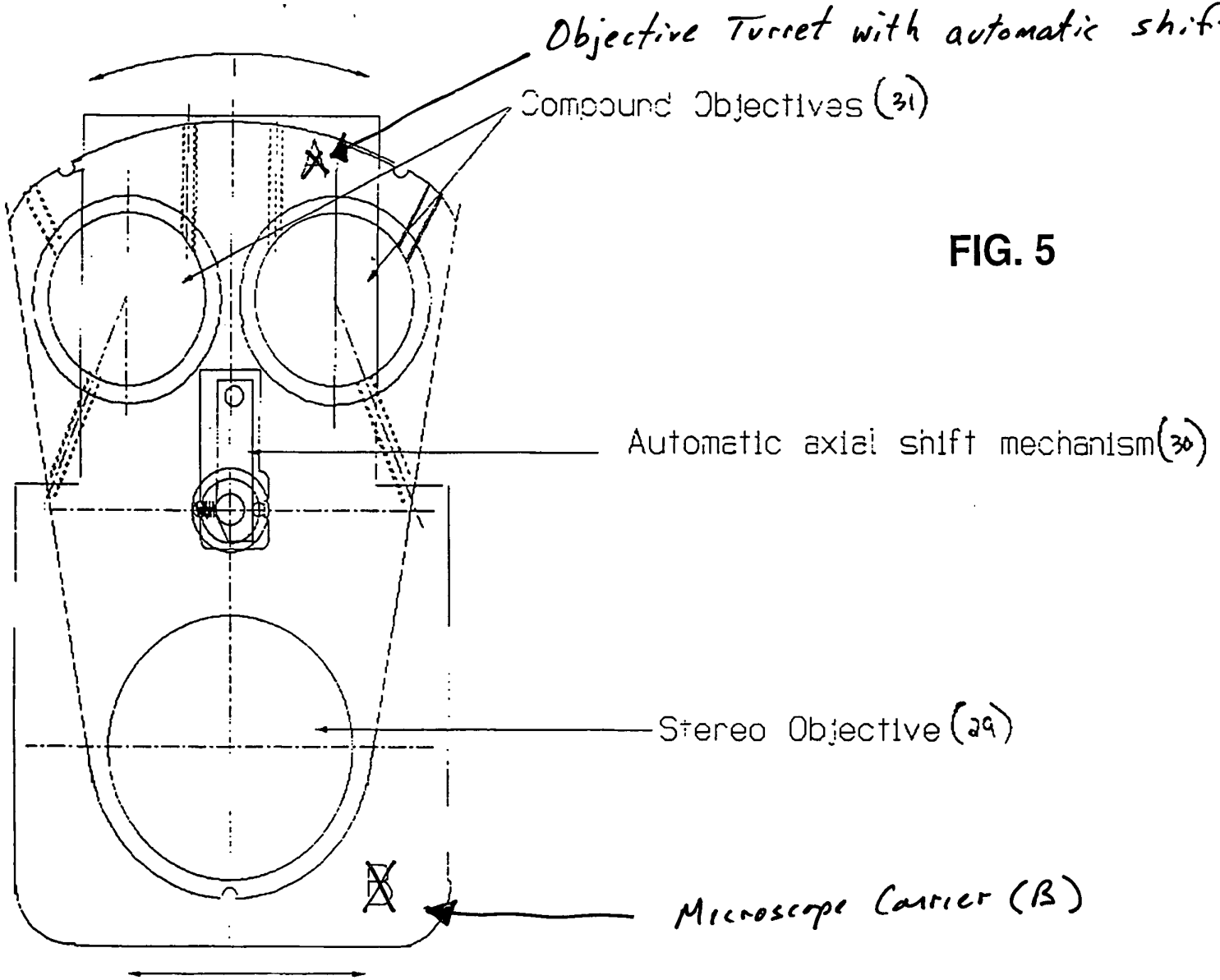



FIG. 5

~~When rotating Objective noseptes [A] the Microcope carrier [B] automatically moves from the Stereo Objective to the compound Objective position~~

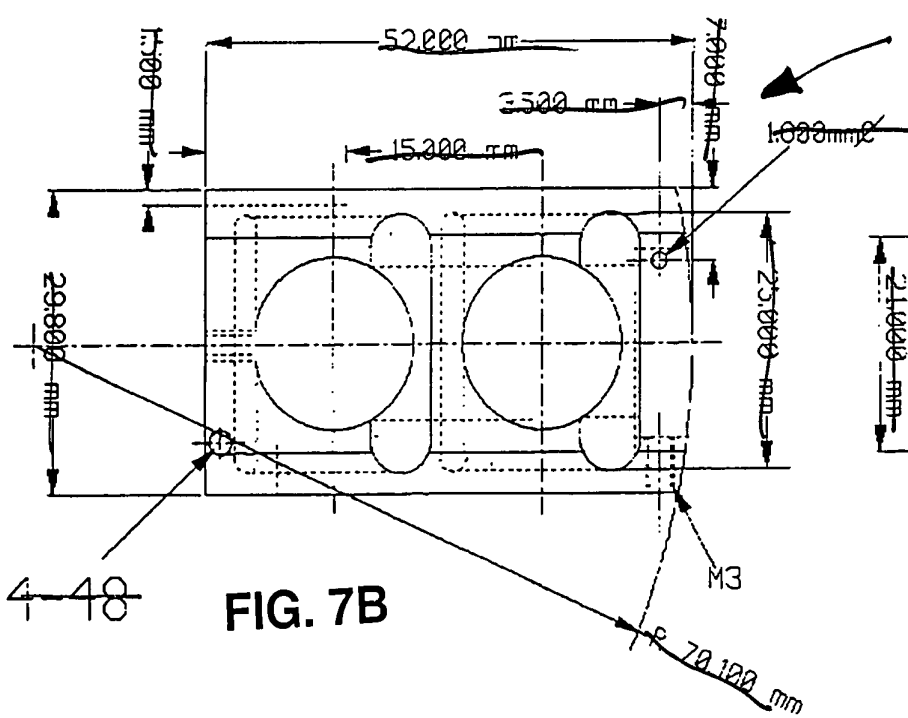



FIG. 7B

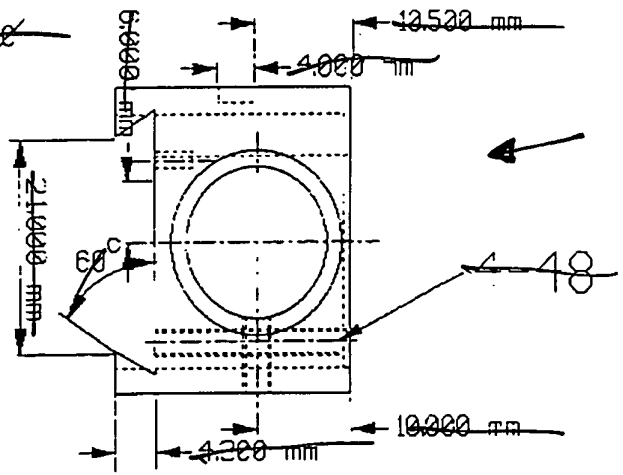



FIG. 7C

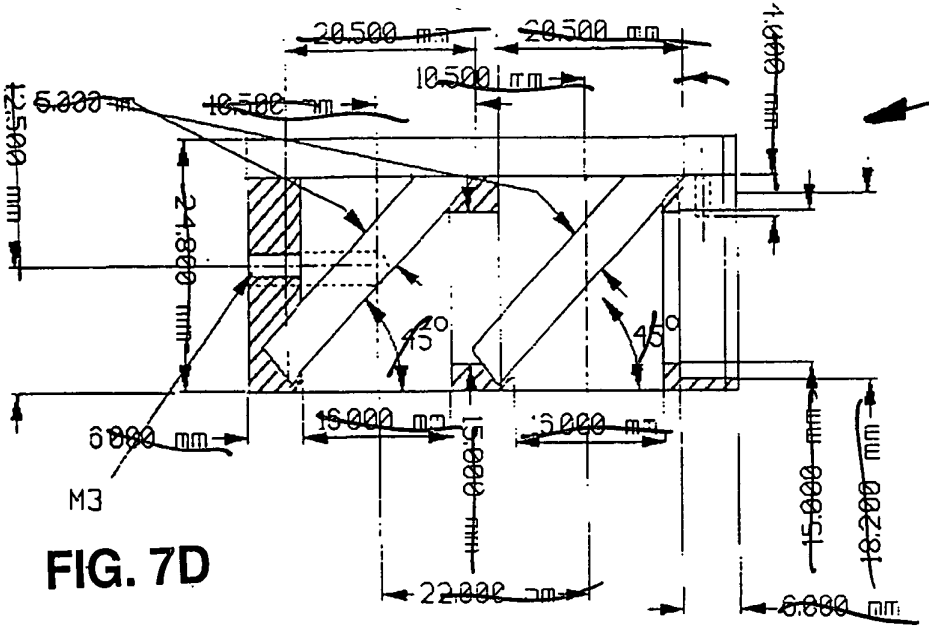



FIG. 7D

Filtermodule
quad